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ScienceDirect

Procedia Engineering 145 (2016) 1370 – 1377

Procedia Engineering

www.elsevier.com/locate/procedia

International Conference on Sustainable Design, Engineering and Construction

Creating a new project management model through research

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Abstract

The principles of a new project management model have been tested for the past 20 years. This project management model utilizes expertise instead of the traditional management, direction, and control (MDC). This new project management model is a leadership-based model instead of a management model. The practice of the new model requires a change in paradigm and project management structure. Some of the practices of this new paradigm include minimizing the flow of information and communications to and from the project manager [including meetings, emails and documents], eliminating technical communications, reducing client management, direction, and control of the vendor, and the hiring of vendors or personnel to do specific tasks. A vendors is hired only after they have clearly shown that they know what they are doing by showing past performance on similar projects, that they clearly understand how to create transparency to minimize risk that they do not control, and that they can clearly outline their project plan using a detailed milestone schedule including time, cost, and tasks all communicated in the language of metrics.

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Peer-review under responsibility of the organizing committee of ICSDEC 2016

Keywords: project management; risk management; construction performance; performance information procurement system; Best Value

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doi:10.1016/j.proeng.2016.04.202

1. Introduction

The delivery of services is inefficient and ineffective. Organizations worldwide continue to have issues with delivering services on time, on budget, with high customer satisfaction. This issue has been documented in the construction and information technology industries. Research has shown the overall performance of services is poor with the following results: 2.5% of projects are defined as successful (scope, cost, schedule, and business), only 30% of projects are completed within 10% of planned cost and schedule, 25 to 50% is wasted due to coordinating labor on a project, and management inefficiency costs owners between $15.6 and $36 billion per year [11, 18, 25]. Literature research has also shown specific documented performance information for both the construction and information technology industries. Both industries have had similar results of poor performance. The construction industry has had the following results [8]:

- From 2000 to 2011, the UK saw an increase in customer satisfaction from 63% to 80%, but its projects were still only completed on time 45% of the time, and met budgets 63% of the time.
- In the U.S., productivity has decreased by 0.8% annually. Construction companies have the second highest failure and bankruptcy rate of 95%. Over 90% of transportation construction jobs are over budget, and almost 50% of time is wasted on job sites.

According to numerous reports in information technology, the poor delivery of services has had the following results:

- U.S. Accountability office identified 413 IT projects, totaling at least $25.2 billion in expenditures for the fiscal year of 2008 as being poorly planned, poor performing, or both, with just under half of IT projects being re-baselined at least once.
- European Services Strategy Unity reported 105 outsourced public sector ICT projects with 57% of contracts, which experienced cost overruns with an average cost overrun of 30.5% and 30% of contracts were ultimately terminated.
- McKinsey& Company analyzed over 5,400 projects and reported 50% of IT projects on average are 45% over budget, 7% over time, provide 56% less value than predicted, and 17% of projects end so poorly they can threaten the life of the company.

Both industries (Construction and IT) have not seen significant changes in the delivery of services in the last 3-6 decades, despite the many efforts and funds spent to improve the nonperformance. This is not just an issue in the construction and information technology industries [1, 2, 3, 5, 9, 13]; many industries are suffering from poor delivery of services and do not understand the source of the problem nor have found any effective methods to resolve the issue. The problem is not just proliferated by one party in each industry, rather multiple parties in the entire supply chain: manufacturers of systems and materials, owners/owner project managers, procurement personnel, general contractors/subcontractors, and general contractor project managers/ sub-contractor project managers. Many of these parties remain in their silos with minimal improvement due to the level of each party's bureaucracy.

Traditionally, project management has been the key to delivering professional services. Project managers (PMs) have been responsible for managing, directing, and controlling projects. PMs are responsible for planning, coordinating between stakeholders, cost-estimating time and materials, and creating schedules (PMI, 2000). The major role of the PM is to efficiently and effectively deliver services. The increasing size of projects and number of projects run simultaneously by project managers has made it difficult to align resources and maintain order between multiple supply chain participants [11, 18, 25]. Due to the increase in project size, PMs are expected to know more and have more experience in order to survive, making an already difficult job more difficult [10]. With the continued poor performance seen in industry, it is difficult to see how project management will improve its performance to deliver services efficiently and effectively with high customer satisfaction.

2. Problem

It was identified through a literature search that the biggest source of inefficiency in society is due to management, direction, and control [5, 8, 15, 21]. Management, direction, and control are identified as anyone attempting to tell someone else what to do. Research has shown when management, direction, and control are exercised performance decreases, cost increases, and individuals become more reactive. This has been evident in the following dominant social cases [9]:

- Prohibition – the U.S. government, in an attempt to reduce the access and consumption of alcohol and decrease crime, passed a law to remove all distribution of alcohol. This resulted in increased cost of law enforcement, increased criminal activity, increased access and consumption of alcohol, and eventually was repealed [24].
- Drug War – popularized by President Nixon in 1971, the U.S. made a declaration to control the flow and use of drugs in the U.S. in order to reduce criminal activity. The U.S. once again, after 46 years, has yet to control drug use, and has only increased in spending to prevent it, with no decrease in criminal activity, flow and access to drugs, and usage [6, 14].
- Online Piracy – with the widespread use of the internet in the late 1990's and early 2000's, copyright infringement affected the movie, software, and music industries. In an attempt to control society from pirating online material, these organizations spent over $200M in the last decade with no significant decrease in pirated materials [4, 12, 22].
- K-12 Education – the traditional educational system uses control principles to try improving student learning and overcome racial and cultural differences in the academic environment. The U.S. remains to be one of the lowest ranked in standardized test scores in the world [19].
- Gun Laws – the U.S. "removal of guns" activists have attempted to have laws passed as a form of control to decrease access to guns and deaths of violent gun users. This attempt to prevent the access to guns and prevent death has only increased cost of the ATF (Bureau of Alcohol, Tobacco, Firearms and Explosives), without a significant decrease in deaths or access to guns [23].

History has shown us one entity cannot control another entity; therefore, any attempt to manage, direct, and control someone should produce consistent predictable results of low performance. Despite this evidence, the authors have historically found that people from all cultures, races, and times, continue to use control as a means to attempt to change people. Similar to the societal cases, it was identified that the traditional project management model used in the industry is also based on management, direction, and control [15]. The following industry tests ran by the Performance Based Studies Research Group out of Arizona State University (ASU) confirmed this [15]. With the understanding that management, direction, and control decreases performance, the following are the results of minimizing management, direction, and control [20]:

- State of Minnesota – The State of Minnesota used PBSRG in the procurement of construction services (University of Minnesota, public school districts), and has been one of the longest running research clients running the BV PIPS over 6 years. The State of Minnesota has overcome the bureaucracy of state procurement, by changing the law to enable the use of the BV PIPS. The State of Minnesota's success has resulted in over 400 procured services delivered, totaling over $169M, with a customer satisfaction rating of 9.5/10.
- U.S. Army Medical Command – The U.S. Army Medical Command used PBSRG in the procurement and management of hospital construction for military bases, as the second longest running research client that used the BV PIPS. These tests resulted in over 600 projects ran, totaling $1B with a decrease in management by 33%, and an on time/on budget increase of up to 68%.
- Arizona State University – ASU is the largest university in the U.S. with over 83K students, 12K faculty, and 4 different campuses. ASU ran two significant tests: the first was a food services contract for a complete renovation of a dining facility, and the second test was to renovate the complex and poor performing IT network. Both projects increased in customer satisfaction and decreased management by up to 79%.

It was found that after measuring the performance of all these case studies, the largest source of risk to project deviation was the owner. Due to the important role of the PM in the delivery of professional services, ramifications of the poor performance related to management, direction, and control lead to recommendations of changing the traditional management, direction, and control based PM model to a PM model based on leadership.

3. Proposal

Management, direction, and control are a major cause of inefficiency in project management. Developing a project management model that minimizes the need for management, direction, and control will increase the efficiency of delivering services.

4. Methodology

The researchers propose using the following methodology:

1. Identify potential new approaches to project management that do not utilize management, direction, and control.
2. Identify the new project management model based on accurate concepts of human nature and natural laws.
3. Test out the new project management model.
4. Confirm that the model can be utilized in different industries to confirm the issue is not a technical issue but a structural issue in how services are delivered.

5. Best Value Performance Information Procurement System / Performance Information Risk Management Process (PIPS/PIRMS)

In 2013, a study was performed identifying the difference between delivery systems [8]. The study reviewed 780 publications in five major databases [EI Compendex, Emerald Journals, ABI/Inform, Google Scholar, and ASCE Library]. From the 780 publications reviewed, 103 delivery systems were analyzed and compared. Additionally, 10 company management models were assessed. Lastly, the top 22 major buyer/supplier theories were identified including: Lean Construction, Supply Chain Management, Total Quality Management (TQM), Just in Time (JIT), Project Management Body of Knowledge (PMBOK), and Conflict Management. After comparing the 133 different delivery approaches the study found that only one of the models did not use management, direction, and control to improve performance of the delivery of services, which was the Performance Information Procurement System/Performance Information Risk Management System (PIPS/PIRMS). PIRMS being a partial form of the PIPS. The BV PIPS was developed by Dr. Dean Kashiwagi, from Arizona State University. The system was first conceived in 1991 as part of Kashiwagi's dissertation [7]. BV PIPS was originally, strictly a selection process. The first test of the process was performed in 1994, used to select roofing systems and contractors for private organizations including Intel, IBM, and McDonald Douglas. The system was documented and performed well enough in the roofing industry, so the system spread to other construction areas. BV PIPS has since been tested in the entire supply chain (construction and non-construction services). Its methodology has been researched and developed, in support of professional groups like the International Council for Research and Innovations in Building and Construction (CIB) and the International Facility Management Association (IFMA) for the last 23 years, and has been identified as a more efficient approach to the delivery of professional services. Some of the impacts of the BV PIPS are as follows [15]:

- 1800+ projects and services delivered / $6.4B of projects and services delivered.
- 123+ unique clients [government and private sectors].
- 98% customer satisfaction / 9.0 (out of 10) client rating of BV PIPS model.
- Decreased the cost of services on average by 31%.
- Vendors were able to offer the client/owner 38% more value.
- Decreased client efforts by up to 79%.

- Largest projects: $100M City of Peoria Wastewater Treatment DB project; $53M Olympic Village/University of Utah Housing Project; $1B Infrastructure project in Netherlands.

The process consists of three major phases (selection, clarification, and execution). During selection, vendors compete based on their level of expertise. The vendor that is highest ranked moves into clarification. In clarification, the vendor is required to explain how they will accomplish work efficiently and with high customer satisfaction. They are required to identify performance metrics that they will track throughout the contract. Upon approval from the client, the vendor moves into the execution phase. In this phase, vendors will receive projects, as work is required. Currently the BV PIPS is used mainly as a procurement and risk management system. The process has project management applications; however, it has not previously been used as a project management system. The PM profession in general, must change from a technical based to a leadership-based approach. Because changes of paradigms cannot be disruptive, a new area of technical expertise must be created within the PM profession. The PM of the future must replace the traditional management model with a new paradigm to become a corporate leader who is not considered a cost. The new paradigm is the PM model of the future. The PM model of the future is based off the project management principles of the BV PIPS, and will be called the Best Value Project Management Model (BV PMM). A literature review was performed to identify the PM principles found in the BV PIPS process. The following publications and sources were used [16]:

1. 200+ academic conference and journal papers.
2. Information Measurement Theory and Best Value Approach manuals.

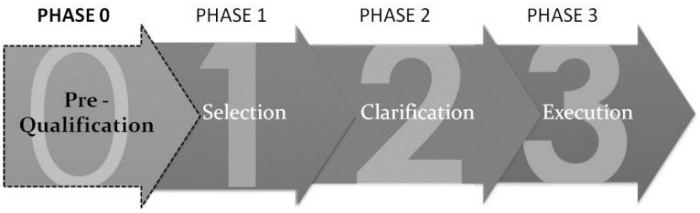

Fig. 1. BV PIPS Model

6. Best Value Project Management Model (BV PMM)

The BV PIPS was derived from the principles of the Industry Structure (IS) model and Information Measurement Theory (IMT). The IS model was developed in 1991, and proposed that the buyer or end user, may be the major source of project cost and time deviation [7]. The IS model proposes that a project manager should not manage, direct, and control others. They should instead utilize the expertise of others on a project. Utilizing expertise instead of management, direction, and control involves the following changes to a project manager's role:

1. Identify an expert to perform the project.
2. The PM is responsible for quality assurance and not quality control. The PM is responsible for ensuring the expert has a plan, the plan is understandable to everyone, and they have a way to measure the quality of their work throughout the project.
3. Minimize the decision making of the PM. The PM requires the expert to take control of the project and make any decisions required. This will also increase the accountability of the expert.
4. Coordinate and ensure any tasks outside of the expert's scope of work are completed for the project.

The Information Measurement Theory (IMT), which uses natural laws and logic to explain reality and identify expertise and value, was also used to develop the BV PIPS system. The main idea IMT proposes is that one individual has no impact, influence, or control on other individuals, it supports the IS in minimizing management, direction, and control. An expert is identified as an individual with more information in a certain area. Hence, the

more expertise someone has the less they believe in the ability to control or influence other people. They act as if they control their own life and have 100% accountability for it. The IS model and IMT identify that the more a PM has to MDC the less efficient they are. Characteristics of management, direction and control are the following:

1. Communications.
2. Meetings.
3. Reports.
4. Inspections.
5. Making decisions.
6. Requirements.

The new BV PMM identifies that the role of the PM changes from being a manager, who uses management, direction, and control, to now being more of a leader. Characteristics of leadership are as follows:

1. No influence/no control.
2. Observes reality.
3. Does not make decisions.
4. Accurately identifies level of expertise.
5. Aligns resources.

Figure 3 identifies how the traditional management model uses inaccurate concepts of motivation, influence, and control to increase worker capability. The manager now requires technical knowledge and understanding. Also in Figure 3, the leader realizes they have no ability to impact, influence, or control anyone. Instead, the leader requires an ability to use the expertise of others and adjusts the structure (alignment of resources) instead of trying to change people in order to increase the overall productivity of the group. This has significant implications when it comes to the paradigm shift for project managers to move from a predominantly management role to a leadership based role. To make this transition the BV PIPS and IMT have identified the following requirements for the new model:

1. The purpose must be to redesign the PM model with the future environment in mind. If it does not change the paradigm from being the expert to utilizing expertise, the profession will continue to be managed, direction, and control based.
2. Due to the PM no longer being the expert, all communication must be non-technical.
3. The non-technical language must be the language of simplicity, metrics, and transparency, minimizing the need for the PM to think and make a decision.
4. The expertise is to integrate the supply chain to think in the best interest of the organization.
5. The core expertise of the new PM is how to deliver higher quality at a lower cost by utilizing expertise.
6. The PM must ensure and require the vendor to simplify the project and create transparency.
7. All efforts must be measured. Measurements must be simple, understandable, and non-technical. Measurement enables the PM to know the level of performance of the expert.
8. The functional areas of the new PM must be increased to all potential supply chain functions including organizational procurement, areas of core expertise of the organization, IT, security, and general PM functions.

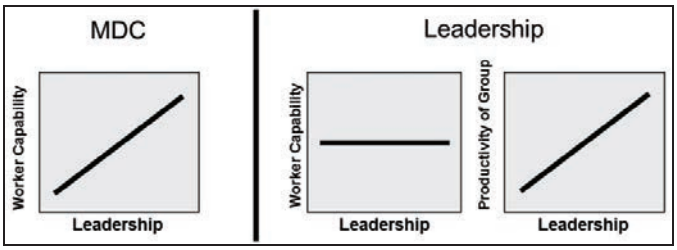

Fig. 2. MDC vs Leadership Model

Characteristics of the best value project management model (BV PMM) are the following:

1. Utilize expertise - align vendors and personnel with projects that fit their expertise.
2. Minimize management, direction, and control (meetings, decisions, reports, inspections, and communications).
3. Non-technical communication – simple and non-technical performance metrics.
4. Quality assurance – ensure that the expert has a plan before they begin a project, and they can explain the progress and changes to the plan throughout the execution of the project.
5. Out of scope coordination – PM takes responsibility for anything outside of the expert's scope of work.
6. Transparency – all stakeholders have access to all project information and can understand the information without an explanation.

7. BV PMM Implementation at Arizona Department of Environmental Quality (ADEQ)

In January 2014, ADEQ partnered with Arizona State University for training, mentorship and assistance in the implementation of the BV PMM for the delivery of their professional services on their environmental engineering projects. ADEQ chose to test the BV PMM in their largest department, the Remedial Projects Unit (RPU), on its Water Quality Assurance Revolving Fund (WQARF) indefinite delivery indefinite quantity (IDIQ) contract. The IDIQ contract had 10 vendors that could perform work for the department. This department was responsible for identifying, assessing, and cleaning up soil, groundwater, and surface water sites contaminated with hazardous substances. The unit conducts these efforts throughout Arizona with support from state and federal funds. The program also oversees privately funded cleanup efforts. Table 1 shows the overall WQARF program performance. After eight months of implementing the BV PMM, the authors identified the following dominant observations:

- Completion rate increased by 40%.
- ADEQ PMs increased work capacity by 140%.
- Vendors performed 94% more work in 33% less time.
- ADEQ customer satisfaction increased by 16%.

Table 1. Overall ADEQ Performance.

No.	Criteria	Traditional	Best Value
1	Total # of projects	35	60
2	Total cost of projects	$5.5M	$5.6M
3	% of projects SOW completed in fiscal year	50%	99%
4	# of ADEQ PMs to manage projects	7	5
5	Customer satisfaction of vendor performance	6.9/10	8/10

8. Conclusion

The performance of delivering services is low. Research has identified that the major constraint in delivering high performance is due to the traditional PM model of management, direction, and control. Management, direction, and control is the source of project inefficiency. The traditional PM model must be changed from management, direction, and control based to the leadership-based structure, which has been defined and tested as the BV PMM. The new model is unique due to its ability to supplement the leadership capability of the PM. The new PM model has been shown to drastically increase the performance of the delivery of services, and has been tested to show that even if a PM is not a leader, they can still be successful if they use the BV approach. The no influence and no control characteristics of the new BV PMM have been evidenced by multiple visionaries (e.g. Ricardo Semler, Bruce Lee, Edward Deming, and Maria Montessori) as a means to increase performance. The new PM model can

also be utilized in multiple industries (e.g. education, professional services, environmental, manufacturing, and martial arts), due to the issue of non-performance being a systems issue and not a technical issue.

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